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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,524	09/26/2003	Brian Nguyen	84436	1194

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EXAMINER	
TORRES, JUAN A	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/672,524	NGUYEN ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2003*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1-21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/26/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 09/26/2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

The drawings are objected to because:

a) The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

a.1) reference characters "110" (figure 1) and "210" (figure 2) have both been used to designate “transformer”;

a.2) reference characters "130" (figure 1) and "330" (figure 3) have both been used to designate “moving average calculator”;

a.3) reference characters "150" (figure 1) and "450" (figure 4) have both been used to designate “transient eliminator”;

a.4) reference characters "160" (figure 1) and "560" (figure 5) have both been used to designate “inverse transformer”;

a.5) reference characters "630" (figure 6) and "730" (figure 7) have both been used to designate “calculates a moving average of power vectors”;

a.6) reference characters "640" (figure 6) and "840" (figure 8) have both been used to designate “excises selected frequency bins of frequency domain vector”; and

a.7) reference characters "650" (figure 6) and "950" (figure 9) have both been used to designate “determines whether to include average power vector in future average power vector determinations”;

b) The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: “730” (see figure 7); and “1000” (see figure 10); and

c) The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

c.1) “700” (see page 13 lines 29 and 31; page 12 line 2);

c.2) “800” (see page 15 lines 3, 5 and 7);

c.3) “900” (see page 16 lines 11, 13 and 15);

c.4) “1000” (see page 17 line 14);

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because uses the form and legal phraseology often used in patent claims, such as "means" and "said,". Correction is required. See MPEP § 608.01(b).

Claim Objections

Claims 1-21 are objected to because of the following informalities:

Regarding claim 1, the recitation in line 9 of claim 1 "vector;" is improper because the next limitation is the last limitation of the claim; it is suggested to be changed to "vector; and" (emphasis added).

Regarding claims 2-13, they are objected because they depend directly or indirectly from claim 1, and claim 1 is objected.

Regarding claim 14, the recitation in line 13 of claim 14 "vector;" is improper because the next limitation is the last limitation of the claim; it is suggested to be changed to "vector; and" (emphasis added).

Regarding claims 15-20, they are objected because they depend directly or indirectly from claim 14, and claim 14 is objected.

Regarding claim 21, the recitation in line 1 of claim 21 "ELF" is improper because this acronyms has not been introduced previously in the claims; it is suggested to be changed to "Extremely Low Frequency (ELF)".

Regarding claim 21, the recitation in line 17 of claim 21 "vector;" is improper because the next limitation is the last limitation of section d); it is suggested to be changed to "vector; and" (emphasis added).

Regarding claim 21, the recitation in line 21 of claim 21 "flag;" is improper because the next limitation is the last limitation of the claim; it is suggested to be changed to "flag; and" (emphasis added).

Claims 7 and 11 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claims 7 and 11 not been further treated on the merits (emphasis added).

Claims 7 and 11 are objected to because it is not clear exactly what is claiming since it is apparently only including part of claim 10 in claim 11. To be dependent on a

claim, the dependent claim must incorporate the entire claim from which it is depending, not just parts.

Claims 10-12 are objected to because of the following informalities:

Regarding claim 10, the recitation in line 1 of claim 10 "The method of Claim 9, wherein said determining sub-step (ii) of Claim 8 comprises" is improper because claim 8 in step (ii) is not determining; it is suggested to be changed to "The method of Claim 9, wherein said determining sub-step (ii) of Claim 9 comprises" (emphasis added) [otherwise claim 10 will be an improper multiple dependent claim, see above].

Regarding claim 11, the recitation in line 1 of claim 11 "The method of Claim 9, wherein said determining sub-step (ii) of Claim 8 comprises" is improper because claim 8 in step (ii) is not determining; it is suggested to be changed to "The method of Claim 9, wherein said determining sub-step (ii) of Claim 9 comprises" (emphasis added) [otherwise claim 11 will be an improper multiple dependent claim, see above].

Regarding claim 12, the recitation in line 1 of claim 12 "The method of Claim 9, wherein said determining sub-step (ii) of Claim 8 comprises" is improper because claim 8 in step (ii) is not determining; it is suggested to be changed to "The method of Claim 9, wherein said determining sub-step (ii) of Claim 9 comprises" (emphasis added) [otherwise claim 12 will be an improper multiple dependent claim, see above].

Appropriate correction is required.

Allowable Subject Matter

Claims 1-21 are allowed if the above objections are overcome.

The following is an examiner's statement of reasons for allowance: claims 1-21are allowed because the references cited fail to teach, as applicant has, a method for excising narrowband interference, the method comprising the steps of a)transforming time domain data into a frequency domain vector having a plurality of frequency bins, b)estimating a plurality of power values corresponding to frequency bins of said frequency domain vector to obtain a current power vector, c)calculating an average power vector from said current power vector and at least one selected previous power vector, d)excising selected frequency bins of said frequency domain vector to produce an excised frequency domain vector, e)determining whether to include said average power vector in future average power vector determinations; a narrowband interference excision device, comprising a) a transformer capable of transforming time domain data to a frequency domain vector comprising a plurality of frequency bins, b) a power estimator, operatively coupled to said transformer, capable of receiving said frequency domain vector, and adapted to determine a PXW power vector comprising a plurality of power values that correspond to said plurality of frequency bins, c) a moving average calculator, operatively coupled to said power estimator, capable of receiving said PXW power vector and a discard flag, and adapted to determine an average power vector, d) an excisor, operatively coupled to said transformer, capable of receiving said frequency domain vector and said average power vector, and adapted to excise selected frequency bins of said plurality of frequency bins and determine an excised power vector and an excision flag vector, e) a transient eliminator, operatively coupled to said excisor and said moving average calculator, capable of receiving said excision flag

vector, and adapted to determine whether to include said average power vector from future average power vector determinations and determine said discard flag; and an Extremely Low Frequency (ELF) receiver, comprising a) an antenna, b) a pre-amplifier, c) an analog-to-digital converter, d) a narrowband interference excision device, comprising i)a transformer capable of transforming time domain data to a frequency domain vector comprising a plurality of frequency bins, ii) a power estimator, operatively coupled to said transformer, capable of receiving said frequency domain vector, and adapted to determine a PXW power vector comprising a plurality of power values that correspond to said plurality of frequency bins, iii) a moving average calculator, operatively coupled to said power estimator, capable of receiving said PXW power vector and a discard flag, and adapted to determine an average power vector, iv) an excisor, operatively coupled to said transformer, capable of receiving said frequency domain vector and said average power vector, and adapted to excise selected frequency bins of said plurality of frequency bins and determine an excised power vector and an excision flag vector, and v) a transient eliminator, operatively coupled to said excisor and said moving average calculator, capable of receiving said excision flag vector, and adapted to determine whether to include said average power vector from future average power vector determinations and determine said discard flag, and at least one receiver processing device, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a) Swanke (US 6477196 B1) discloses excising one or more narrow-band interfering signals in a direct sequence spread spectrum receiver that performs a magnitude spectral analysis on baseband signals in a detection channel to determine which frequency bins in the spectral analysis output contain the interfering narrow-band signals by comparing the magnitude of the signals in the frequency bins to a threshold;

b) Wade (US 5263048 A) discloses narrow band interference frequency excision via phase domain normalization;

c) Rouquette (US 6975673 B1) discloses arrow-band interference rejection of narrow-band jamming signals using digital signal processing frequency domain techniques;

d) Blanchard (US 5612978 A) discloses adaptively canceling unwanted signals in a dynamic interference environment;

e) Cantwell (US 5410750 A) discloses A FFT at the front end of the interference detector detects samples of all the interferences in the frequency domain, the samples are scaled for gain control and detection of interferences above a predetermined threshold and the interference detector suppresses interferences to the predetermined threshold level; the scaled frequency domain interference samples are phase rotated

and fed to an inverse fast Fourier transform to obtain a time domain replica of the interferences which are phase shifted replicas of the detected interferences.

f) Clelland (US 20020142725 A1) discloses active suppression of undesired signals using a feedback loop (see figure 3);

g) Howard ("Narrowband interference rejection using small FFT block sizes Military Communications Conference, 1992. MILCOM '92, Conference Record. "Communications - Fusing Command, Control and Intelligence", IEEE 11-14 Oct. 1992 Page(s): 608 - 612 vol.2) discloses narrowband interference rejection using small FFT block sizes;

h) Davidovici ("Narrow-band interference rejection using real-time Fourier transforms", IEEE Transactions on Communications, Volume 37, Issue 7, July 1989 Page(s): 713 – 722) discloses narrowband interference rejection using real-time Fourier transforms;

i) Gevargiz ("Adaptive narrow-band interference rejection in a DS spread-spectrum intercept receiver using transform domain signal processing techniques", IEEE Transactions on Communications, Volume 37, Issue 12, Dec. 1989 Page(s): 1359 – 1366) discloses narrowband interference rejection using transform domain signal processing techniques; and

j) DiPietro ("An FFT based technique for suppressing narrow-band interference in PN spread spectrum communications systems", 1989 International Conference on Acoustics, Speech, and Signal Processing, 1989. ICASSP-89., 23-26 May 1989 Page(s):1360 - 1363 vol.2) discloses analyses and performance predictions of an FFT-

based narrowband interference suppression filter for use in PN (pseudonoise) spread-spectrum communications systems.

This application is in condition for allowance except for the following formal matters:

See above.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 25 USPQ 74, 453 O.G. 213, (Comm'r Pat. 1935).

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is 571-272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres
05-31-2007

TEMESGHEN GHEBRETINSAE
PRIMARY EXAMINER